

WHAT IS CLAIMED IS:

1. A transmission device performing transmission control on a ring network comprising:

5 a setting information relay unit relaying setting information that places a specific channel out of a channel used for restoration;

a channel establishment unit determining, by referring to the setting information, whether a channel of
10 interest should be placed out of a channel for restoration and establishing the channel; and

a route switch control unit recognizing a section in which the channel that is not used for restoration has been established and a fault bypass control condition at
15 the time of occurrence of a fault and performing a route switching control based on a result of recognition.

2. The transmission device as claimed in claim 1, wherein said setting information relay unit uses an idle
20 byte out of overhead bytes in order to relay the setting information.

3. The transmission device as claimed in claim 1, wherein:

25 the setting information includes NUT table information that contains a start transmission device ID and an end transmission device ID that indicate a section

in which the channel to be placed out of the channel used for restoration should be established, a type of setting of placing the channel out of the channel used for restoration, and a relay direction; and

5 said channel establishment unit recognizes and establishes the channel to be placed out of the channel used for restoration via a designated write address in which the NUT table information should be written.

10 4. The transmission device as claimed in claim 1, wherein:

 said setting information relay unit sends the setting information including an establishment request message, and sends an establishment execution message
15 after receiving a normal response sent back thereto; and

 said channel establishment unit receives the establishment execution message and establishes the channel to be placed out of the channel used for restoration.

20 5. The transmission device as claimed in claim 1, wherein said setting information relay unit of a start transmission device is externally provided with the setting information, the setting information externally
25 provided being relayed to an end transmission device, so that the channel to be placed out of the channel used for restoration can be established.

6. The transmission device as claimed in claim 1,
wherein the setting information is relayed to all
transmission devices in the ring network from the setting
information relay unit in an arbitrary transmission, so
that the channel to be placed out of the channel used for
restoration can be established.

7. The transmission device as claimed in claim 1,
wherein, when line switching is performed at ends of a
line in which a fault occurs as the fault bypass control
condition, the route switch control units in the
transmission devices located at ends of a line in which a
fault occurs perform route switching if a fault bypass
route does not have any section in which the channel to be
placed out of the channel used for restoration has not
been established, and do not perform route switching if a
fault bypass route has a section in which the channel to
be placed out of the channel used for restoration has been
established.

8. The transmission device as claimed in claim 1,
wherein, when line switching is performed at ends of a
path as the fault bypass control condition, the route
switch control units in the transmission devices located
at ends of the path perform route switching if a fault
bypass route does not have any section in which the

channel to be placed out of the channel used for restoration has not been established, and do not perform route switching if a fault bypass route has a section in which the channel to be placed out of the channel used for restoration has been established.

9. A transmission system performing transmission control on a network comprising:

a plurality of transmission devices each comprising a setting information relay unit relaying setting information that places a specific channel out of a channel used for restoration; a channel establishment unit determining, by referring to the setting information, whether a channel of interest should be placed out of a channel for restoration and establishing the channel; and a route switch control unit recognizing a section in which the channel that is not used for restoration has been established and a fault bypass control condition at the time of occurrence of a fault and performing a route switching control based on a result of recognition; and

transmission media connecting the plurality of transmission devices in a ring formation so that a ring network is formed.

10. A transmission device on a ring network comprising:

a setting information relay unit relaying NUT

setting information for setting a specific channel to NUT setting that places the specific channel out of a channel used for BLSR restoration;

5 a channel establishment unit determining, by referring to the NUT setting information, whether a channel of interest should be set to NUT setting so as to establish a NUT channel; and

10 a route switch control unit recognizing a section in which NUT has been established and a fault bypass control condition at the time of occurrence of a fault and performing a route switching control based on a result of recognition.

15 11. The transmission device as claimed in claim 10, wherein said setting information relay unit uses D bytes out of overhead bytes in order to relay the NUT setting information.

20 12. The transmission device as claimed in claim 10, wherein:

the NUT setting information includes NUT table information that contains a start transmission device ID and an end transmission device ID that indicate a section in which the NUT channel should be established, a type of
25 NUT setting including a basic NUT and an enhanced NUT, and a relay direction including an east direction and a west direction; and

said channel establishment unit recognizes and establishes the NUT channel via a designated write address in which the NUT table information should be written.

5 13. The transmission device as claimed in claim 10, wherein:

 said setting information relay unit sends the NUT setting information including an establishment request message, and sends an establishment execution message after receiving a normal response sent back thereto; and

10 said channel establishment unit receives the establishment execution message and establishes the NUT channel.

15 14. The transmission device as claimed in claim 10, wherein said setting information relay unit of a start transmission device is externally provided with the NUT setting information, the NUT setting information externally provided being relayed to an end transmission device, so that the NUT channel can be established.

20 15. The transmission device as claimed in claim 10, wherein the NUT setting information is relayed to all transmission devices in the ring network from the setting information relay unit in an arbitrary transmission, so

25 that the NUT channel can be established.

16. The transmission device as claimed in claim 10, wherein, when the BLSR employs line switching that is performed at ends of a line in which a fault occurs as the fault bypass control condition, the route switch control units in the transmission devices located at ends of the line in which the fault occurs perform route switching if a fault bypass route does not have any section in which the NUT channel has not been established, and do not perform route switching if a fault bypass route has a section in which the NUT channel has been established.

17. The transmission device as claimed in claim 10, wherein, when the BLSR employs a submarine BLSR in which line switching is performed at ends of a path as the fault bypass control condition, the route switch control units in the transmission devices located at ends of the path perform route switching if a fault bypass route does not have any section in which the NUT channel has not been established, and do not perform route switching if a fault bypass route has a section in which the NUT channel has been established.

18. A transmission system performing a transmission control on a network comprising:
a plurality of transmission devices each comprising a setting information relay unit relaying NUT setting information for setting a specific channel to NUT

setting that places the specific channel out of a channel used for BLSR restoration, a channel establishment unit determining, by referring to the NUT setting information, whether a channel of interest should be set to NUT setting so as to establish a NUT channel, and a route switch control unit recognizing a section in which NUT has been established and a fault bypass control condition at the time of occurrence of a fault and performing a route switching control based on a result of recognition.

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